



# **The cows and the climate – historical data reveal unexpected facts**

**In Germany, livestock have been emitting less methane since 2003 than in 1892**

**Two scientists from the Research Institute for Farm Animal Biology Dummerstorf (FBN) compared the methane emissions of farm animals at the end of the 19th century with today's values. The result was surprising: since 2003, methane emissions have been lower than in 1892. The results of the study were published in the journal "Science of The Total Environment".\***

Methane is a greenhouse gas that is co-responsible for global warming. A large part of the emissions are caused by humans, with agriculture and especially livestock farming accounting for a considerable part. In its Climate Protection Act, Germany pursues the goal of achieving greenhouse gas neutrality by 2045. To achieve this, emissions from all sectors must be reduced by 65 percent by 2030 compared to 1990. Accordingly, methane emissions produced in the course of digestion by farm animals would have to be reduced to 853,000 metric tons by 2030 (2020: 927,000 metric tons).

## **Methane emissions from livestock yesterday and today**

Nowadays we know the current methane emissions of farm animals quite precisely, but we know relatively little about the situation in the 19th century, when the onset of global warming is already detectable. Dr Björn Kuhla and Dr Gunther Viereck from the FBN took this as an opportunity to see whether it is possible to make a data-based statement about methane emissions from farm animals in the German Empire and make them comparable with today's values.

"We analysed the data from the Germany-wide livestock censuses of 1872, 1883 and 1892. From the body weights we were able to calculate the feed intake. In other sources we found information on feeding and meat and milk production in the 19th century. With this information, it was possible to calculate methane emissions using standardised estimating equations. The territorial changes since the founding of the German Empire in 1871 were also taken into account," Kuhla explained. "In doing so, we were surprised to find that methane emissions from the digestion of livestock in Germany have been lower since 2003 than in 1892. Our study indicates that the climate goals targeted by the German government in the livestock sector are within reach."

Annual methane emissions from livestock farming were 898,000 metric tons in 1883 and a full 1,060,000 metric tons in 1892. The emission target of 853,000 metric tons for 2030 is thus 207,000 metric tons below the 1892 emission level. Since 2003, livestock in Germany have actually been emitting less methane than in 1892. From 1990 to 2021, methane emissions from the digestion of livestock fell by 390,000 metric tons to 930,000 metric tons.



The two researchers see one reason for this in the sharp decline in animal numbers for cattle, sheep and goats. Although the population on the present-day territory of Germany has grown significantly over the last 130 years to 84 million, with around 34 million people at that time, their supply could be ensured with a smaller number of animals thanks to the higher performance of the animals and a high efficiency in animal husbandry, which was accompanied by a decrease in methane emissions.

In 1892, for example, a total of 12.45 million “cows and other bovine animals”, 8.93 million sheep, 2.53 million goats and 2.33 million horses were statistically recorded. In Germany, 11 million cattle, 1.5 million sheep, 140,000 goats and 1.3 million horses are currently kept (source: bmel-statistik.de and AWA analysis).

### **How can the emission goals in Germany be achieved?**

The researchers at the FBN see possible solutions for a further successful reduction of methane emissions primarily in pig farming. Although pigs produce relatively little methane, on the other hand, every fifth pig in Germany is not needed to feed the population. A reduction of 20 percent in the number of pigs would save 5,000 metric tons of methane per year. In addition, there would be savings of several thousand metric tons of carbon dioxide - also a harmful greenhouse gas - in connection with the import of soy feed. Since soy is also suitable for human consumption, reduced use as feed would reduce the competition between trough and plate.

There are also opportunities to reduce methane emissions from cattle. The self-sufficiency rate for milk in Germany is 112 percent. Reducing herds would neither jeopardise food security nor challenge dietary habits. Feeding regionally available biomass that is not suitable for human consumption would also reduce emissions by eliminating feed imports without competing with human food.

### **And the international perspective?**

“We are observing a strong increase in population numbers in Africa, Asia and South America and, in parallel, in livestock populations and their methane emissions,” says Kuhla. “At the same time, cows, sheep and goats in these regions are the least efficient at producing food. By improving efficiency, animal numbers and emissions could also be reduced in these regions and the regional supply of food of animal origin could be guaranteed.”

### **\*Original study**

**Science of The Total Environment** B. Kuhla, G. Viereck (2022) Enteric methane emission factors, total emissions and intensities from Germany's livestock in the late 19th century: A comparison with the today's emission rates and intensities, *Science of The Total Environment* 848, 157754, <https://doi.org/10.1016/j.scitotenv.2022.157754>



**Photo: FBN**

*Are cows wrongly referred to as climate killers? Researchers at the FBN have found that climate targets for methane can be achieved with efficient farming.*

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